

FACTSHEET

Sea Pollution

It seems that almost every day there is another story about pollution of one form or another, in the food we eat, the water we drink and the air we breathe. Very often our own actions lead to that pollution and in many cases we can do something about it.

Polluting the Seas

Pollution is anything that is present or introduced into an environment which causes harm. In the sea there are many kinds of pollution such as rubbish, oil, chemicals and even sewage from our toilets!

In the last ten years our waters have borne the brunt of serious pollution accidents, but these are becoming less common as technologies develop and the affects become better understood. But, there is still an awful lot to learn about the effects of polluting our marine environments. Often the pollution cannot be seen by the naked eye, and sometimes pollution will never disappear from the water.

In many ways it is our own actions that lead to pollution and in some cases we can do something about it. For example, buying local products reduces the demand for food from overseas, reducing the amount of ships needed to carry this food, and in turn reducing the pollution they cause on the oceans and the waste they dispose of.

Follow the links at the side to explore the factsheet and find out ways in which you can help and where to go for more information.

Chemical Pollution

Chemical pollution is when fluids, often toxic, get released into the water. Chemicals can find their way into the sea in many ways and come from all sorts of places. Lets take a look -

Industry - Sometimes factories and industry will allow waste products to flow into streams and rivers which eventually get to the sea. Sometimes chemicals are dumped at sea. Chemicals are used in millions of processes whether it is making food, plastic toys, CDs building materials, gadgets or electricals. Through rivers and streams some pollutants enter marine food chains, building up their concentrations until they reach toxic levels.

It often takes human casualties to alert us to pollution and such was the case in Minimata Bay in Japan when many people died as a result of a pollutant building up in food chains. A factory was discharging waste containing methyl mercury in low concentrations into the sea and as this pollutant passed through food chains it became more concentrated in the tissues of marine organisms until it reached toxic levels. As a consequence over a thousand people died from eating fish and shellfish contaminated with mercury and around two thousand people suffered from mercury poisoning.

Farming - Pesticides and herbicides are chemicals sprayed onto food crops to control insects and weeds. These chemicals are often toxic as they are designed to kill or repel animals and contain some synthetic (man-made) chemicals. When sprayed onto crops these substances get left in the soil and can easily find their way into freshwater streams and rivers and end up in the sea. Once in the sea these chemicals often do not disappear by biodegrading as they are resistant to natural breakdown processes but stay in the sea and enter the food chain.

Medicine - Sometimes medicines that humans and animals take also contain bad chemicals and these make their way into the sea through our toilets, into sewage treatment plants and then out into rivers into the sea. For us these chemicals are tolerable in small doses but in aquatic environments they can build up and cause fertility problems in fish.

At home - In our homes we use many different sorts of cleaning, washing and polishing products which all contain various chemicals which often end up down the drain when washed out of dishclothes or used in the bath or kitchen sink. These chemicals may be harmful to wildlife and marine environments as they can contain harmful substances such as sodium hypochlorite, petroleum distillates, phenol and cresol, ammonia and formaldehyde. Buying cleaning products that contain natural soluble/biodegradable ingredients helps to prevent these nasty fluids from ending up in natural water sources. To find out how our washing machines contribute to sea pollution see the Plastic pollution section below. See [How to Clean Up our Water](#) for twelve handy tips from the Natural Resources Defense Council.

There are concerns about exactly how these chemicals, that are now mixing together in rivers and oceans, are affecting marine environments and little is known about the effect this may have in humans.

Oil Pollution

Oil is a natural substance found miles below the earth's surface. It is the result of millions of years of decaying trees and dead matter undergoing large amounts of pressure as it becomes buried deep beneath the earth's surface.



When in large quantities oil can be a very damaging chemical for marine life due to its sticky, slimy and, well, oily nature. Oil can enter the sea in many ways, either from inland through rivers and outlets, from ships and tankers when they run aground, or from oil drilling. It can also make its own way onto the surface of the earth, these natural areas are known as oil seeps.

Although oil enters the sea from many sources and can even occur naturally in marine environments it is the often massive scale of human oil spills that cause devastating effects to wildlife and ecosystems. Don't be fooled by the word 'spill' either - the largest ever oil spill is said to have been the Deepwater Horizon oil spill in the Gulf of Mexico in April 2010 where about 4 million barrels of oil were spilt affecting 4000 miles of coastline.

The location of an oil spill also affects how damaging the slick is - areas rich in wildlife, or habitats that are particularly fragile such as coral reefs, can expect to suffer more. A spill near a sandy beach makes clean up operations much harder than spills on rocky cliffs. Birds are especially prone to problems if the oil gets onto their feathers which are naturally water repellent. Birds that become covered in the thick and sticky substance are no longer waterproof which makes swimming or flying impossible. And if swallowed the toxic oil can damage organs and cause death.

Oil can take months or even years to disappear and is a tricky substance to clean up. It does break up naturally but when there are several thousand tonnes of it we need to step in and help clear it up. Ways of dealing with spills and slicks are by soaking it up, adding chemicals to it to break it up and make it less harmful, sucking it up with a big machine a bit like a vacuum Hoover, skimming it off of the sea's surface or burning and evaporating it.

Crude oil is made up of over 1,000 chemicals. Of these, the light hydrocarbons, which are used to make petrol and aviation fuel are the most toxic. In warm conditions, these usually evaporate quite quickly, making a foul smell, but reducing the danger to wildlife. In cold seas, however, the process of evaporation can be very slow, and this means the risk to wildlife lasts longer. To prevent this, the light hydrocarbons are often burned off the surface of the sea.

In this country, we have a group of patrol aircraft whose job it is to search for oil floating on the surface of our seas. The spotter planes are able to distinguish different types of oil, and work alongside dispersant-spraying aircraft so that oil can be treated quickly and in the most effective way possible.

Sewage

Many sewage pipelines were built years ago when little was known about the effects of sewer pollution - it was thought that the sea would dilute the sewage. Since then many of these have been blocked and removed but there are still areas of the UK where raw sewage is discharged on a daily basis. The quality of the water around our coasts is assessed against standards set up by the European Community and over 350 British resorts are subject to inspection. At the moment these standards only apply to major resorts but public demand may eventually lead to other bathing beaches being inspected too.

There are no official signs to warn the public of sewage pollution but there are some useful booklists available which give details of polluted beaches. The list of British Blue Flag beaches indicates the bathing waters which have passed certain standards of cleanliness.



Cruise ships dump a considerable amount of sewage into the ocean. It is [estimated](#) that 95,000 cubic metres of sewage from toilets and 5,420,000 cubic metres of sewage from sinks, galleys and showers are released into the oceans each day.

If you suspect that the water at a resort is unfit for bathing you should report the matter to the local council. If the public outcry is loud enough the authorities will be forced to consider further treatment of the sewage before releasing it into the sea. If you wish to do more about sea pollution the Marine Conservation Society would welcome your support.

Radioactive Waste

Industries that produce nuclear waste are nuclear power stations, reprocessing plants and the military. As the nuclear energy industry grows, more and more radioactive waste is disposed of every year. In 2006 [UK nuclear waste disposal](#) amounted to 12,900 cubic metres - that's enough to fill over five Olympic swimming pools!



Nuclear radiation occurs naturally throughout the world and universe, but it comes in many different forms (including man-made forms), some more poisonous than others. All forms of nuclear radiation travel in invisible rays, some rays are weak and would not pass through a piece of paper, but other rays can pass straight through metal. In the same way some rays can pass into our bodies, or be eaten or breathed in - but other rays are too big and cannot. So, it is this invisible radiation which is causing worry, as it can spread miles and miles in the form of clouds, affecting other countries.

Since 1952 low levels of radioactive waste have been discharged into the Irish Sea, the English Channel and the Arctic Ocean. It is recognised that radioactive material needs to be isolated and encased (in glass and concrete) to prevent leakage on the ocean floor and it is now kept on land for some time whilst radioactivity levels decrease.

What long term effects might this have on marine environments? Certainly radiation can enter the food chain through plankton and kelp and then go on to contaminate fish. Radioactive caesium and plutonium has already been found in seals and porpoises in the Irish Sea.

On 11th March 2011 the tragic earthquake and tsunami that hit Japan caused major damage to the Fukushima Daiichi nuclear power plant. This natural disaster caused thousands of tons of radioactive water to be released into the Pacific Ocean.

Radioactivity levels reduce over time, although this can take anything from two weeks to five hundred thousands years or more before reaching a safe level. This kind of waste also needs to be safe from terrorism and natural disasters. Lack of available space on land and its proximity to people has meant that storing it at sea has been seen as a safer and more straightforward option. Any leakages are much more easily dispersed over a greater area in the sea, than in the air, although they can travel further through water.

Credits

Image: Sea Pollution by [Clifton Beard](#)

Plastic pollution

Unfortunately the sea does get treated like a dustbin by many people and even companies. Litter left on beaches or thrown out at sea all contribute to many plastic pollution problems. Here are a few ways in which our litter affects marine wildlife -

Plastic diet - Marine birds, turtles and fish are among the most affected by their plastic diets. But it's not just a problem for small creatures. Sperm whales are said to eat over 100 millions tonnes of seafood a year, but increasingly this diet is including our waste too. The building up of rubbish in animals' bellies means there is less space in their stomachs to get the nutrients they need. There are also terrible affects when toxic metals and chemicals are released as a result of the debris being broken down in the belly which can lead to poisoning. Sometimes debris with sharp edges cause damage to animals throats and insides, or large pieces may become lodged in their digestion tracts.

Sometimes plastic debris is eaten by accident but often these plastics can also be mistaken for food as they look very similar to other organisms, that float about just the same.

Little things that seem harmless to us such as bottle tops and plastic bags can cause havoc in the environment - whether it is in the countryside or the sea. But it's not just by eating this rubbish that wildlife can become harmed - there are also thousands of deaths every year caused by animals becoming entangled and stuck in rubbish. This is a great reason never to drop litter and to recycle as much rubbish as you can.

Microplastics - Microplastics are microscopic particles of plastic and you may be surprised to find that most of these come from our washing machines! Eighteen water samples taken from beaches around the world were all found to contain microplastics. Fabric particles such as polyester, acrylic

and nylon were among the major finds across the samples. Nowadays most of our clothes are made up of these synthetic fibres -researchers have discovered that just one garment can release up to 1,900 microplastic particles per wash!

When swallowed by animals these particles can become lodged in their cells which may cause harm and may also enter the food chain. In 2004 scientists tested plankton samples right back to the 1960s and found that the levels of microplastics had increased significantly over time. In recent tests they found that there were more plastic particles per sample than plankton! It is not yet known what the long term effects of this may be, but what we do know is that this plastic pollution will only increase as the production of synthetic fibre grows.

Ocean dustbin - The Great Pacific Garbage Patch is a massive area of the Pacific Ocean that contains an alarming amount of rubbish! It is thought that all this rubbish has gathered and stayed there because of rotating sea currents, known as gyres. This plastic soup floats just below the surface and it is thought that some of the debris has been around for decades. This is the problem with plastic - it can never disappear. It does however, get smaller and smaller over time as the sun shines on it and splits it - this process is called photodegradation. In the process leaches toxic chemicals such as bisphenol A, PCBs, and derivatives of polystyrene.

This garbage patch cannot be seen from space (although the area it covers is the size of a small country!) and isn't like an island of rubbish that you could walk on. The patch is defined by the higher than normal concentrations of debris and plastics. 10 metres below the surface there are all colours of plastic and bits floating about like flakes of fish food.

Here's some interesting information about plastic and how it is made -

'Nearly all the plastic items in our lives begin as little manufactured pellets of raw plastic resin, which are known in the industry as nurdles. More than 100 billion kilograms of them are shipped around the world every year, delivered to processing plants and then heated up, treated with other chemicals, stretched and moulded into our familiar products, containers and packaging.

During their loadings and unloadings, however, nurdles have a knack for spilling and escaping. They are light enough to become airborne in a good wind. They float wonderfully and can now be found in every ocean in the world, hence their new nickname: mermaids' tears.'. [Drowning in plastic: The Great Pacific Garbage Patch is twice the size of France](#) - Richard Grant, Telegraph

Remember - It is only humans that make materials that nature can't digest!

[Plastic Debris in the World's Oceans](#) - Report by Greenpeace for the United Nations Environment Programme - (pdf download).

How to help

Investigating sea pollution

Rubbish discarded at sea is often washed ashore onto our beaches polluting the coastline, but what kind of litter is thrown away and where does it come from? Very often the tide brings in such a lot of debris that it would be impossible to record each item of litter. A way of overcoming this problem is to examine selected areas of the beach and to set up a line transect enabling a survey of the litter to be carried out. Stretch a line, marked at regular intervals, from the sea across the beach and record the litter that you find at each point on the transect. Make a note of the composition of the litter stating whether it is made of plastic, wood, metal, glass, paper, rope or cardboard. Also record the identity of each item such as fishing line, nets, containers or wire. Containers of plastic and metal are the most frequently reported litter. Drinks containers are common, mostly of the pull-tab type probably thrown away by holidaymakers. There is more rubbish on the beach in the winter, probably because of the prevailing winds and large waves which force the litter ashore.

How to help

- Always recycle when possible
- Never ever drop litter
- Take your rubbish home with you when you leave the beach
- Try to buy products made of natural fibre whenever possible
- Buy a reusable shopping bag and say no to plastic ones!
- Many household cleaning products contain harmful chemicals which are washed down the drain. Encourage your parents to buy eco-friendly products or even make your own from natural substances like vinegar and lemon juice.
- Organise a beach clean with friends and family - but remember to wear rubber gloves and look out for sharp objects

See [How to Clean Up our Water](#) for twelve handy tips from the Natural Resources Defense Council.

Remember - natural is best!



The Young People's Trust for the Environment is a charity which aims to encourage young people's understanding of the environment and the need for sustainability.

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